## Claims

1. An intraocular correction lens for implantation in the posterior chamber of the eye between the iris and the intact natural lens comprising a centrally located optical part capable of providing an optical correction and a peripherally located supporting element capable of maintaining said optical part in said central location, wherein said optical part and said support element together have a concave posterior surface which is part of a non-spherical surface that is rotation symmetric around the optical axis of said optical part, wherein the intersection between said non-spherical surface and any plane containing the optical axis represents a flawless curve free from discontinuities and points of inflection.

2. A correction lens according to claim 1, wherein the flawless curve is at least extended in a direction towards the lens periphery within an area defined by the projection of the natural lens on the posterior surface of said correction lens in a direction parallel to the optical axis.

3. A correction lens according to claim 2, wherein the flawless curve is at least extended in a direction towards the lens periphery within an area defined by the projection of the zonula-free natural lens on the posterior surface of said correction lens in a direction parallel to the optical axis.

4. A correction lens according to claim 2, wherein the flawless curve has substantially the same extension as the width of the lens.

5. A correction lens according to claims 2, wherein the supporting element comprises an inner part and a peripheral part designed so as to be at least partially in contact with the ciliary sulcus and the zonulas.

6. A correction lens according to claim 5, wherein the peripheral part is flawlessly connected to the inner part.

7. A correction lens according to claim 5, wherein the peripheral part is connected to the

5      inner part at a point of inflection

8. A correction lens according to any of claims 5 to 7, wherein the peripheral part follows a curve diverging towards a plane perpendicular to the optical axis.

10   9. A correction lens according to claim 1, wherein the central radius of the posterior surface of the optical part is different than the central radius of natural lens in its non-accommodated state.

10. A correction lens according to claim 9, wherein the central radius of the posterior

15     surface is substantially smaller than the central radius of the natural lens.

11. A correction lens according to claim 10, wherein the central radius of the posterior surface is less than about 7 mm.

20   12. A correction lens according to claim 9, wherein the central radius of the posterior surface is substantially larger than the central radius of the natural lens.

13. A correction lens according to claim 12, wherein the central radius of the posterior surface is larger than about 14 mm.

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14. A correction lens according to claim 9, wherein the radius of the posterior surface increases from the central part towards the lens periphery.

15. A correction lens according to claim 1, wherein the flawless curve comprises two or

30     more tangentially attached circle segments.

16. A correction lens according to claim 15, wherein the flawless curve comprises three tangentially attached circle segments.

17. A correction lens according to claim 16, wherein the three tangentially attached circle segments consist of a centrally located segment having a radius different to that of the natural lens in its non-accommodated state and two peripheral segments.

18. A correction lens according to claim 17, wherein the centrally located segment corresponds to the optical part and the peripheral segments correspond to the inner part of the support element.

19. A correction lens according to claim 18, wherein the three tangentially attached circle segments together approximate an ellipsoidal curve.

20. A correction lens according to claim 1, wherein the flawless curve substantially follows the curve formula $z = cvr^2/(1 + \sqrt{(1 - cv^2(cc + 1)r^2)})$, where z is the axial coordinate of the curve, r is the radial coordinate of the curve, cv is the reciprocal central radius of the optical part and cc is the conic constant to shape the curve which not is equal to zero.

21. A correction lens according to claim 20, wherein the curve formula is adjusted with one or several additional polynomal factors $a_1 r^4 + a_2 r^6 + a_3 r^8 + a_4 r^{10} + ... + a_n r^{2(n-1)}$, wherein $a_1, a_2, a_3, a_4, ....a_n$ are aspheric constants, thereby generating the curve formula $z = cvr^2/(1 + \sqrt{(1 - cv^2(cc + 1)r^2)}) + a_1 r^4 + a_2 r^6 + a_3 r^8 + a_4 r^{10} + ... + a_n r^{2(n-1)}$

22. A correction lens according to claim 20 or 21, wherein the flawless curve has a central radius proximal to the optical axis less than the radius of the natural lens in its

non-accommodated state, said curve substantially following a parabolic or hyperbolic curve formula.

23. A correction lens according to claim 20 or 21, wherein the flawless curve has a central radius proximal to the optical axis larger than the radius of the natural lens in its non-accommodated state, said curve substantially following an ellipsoidal curve formula.

24. A correction lens according to claim 1, wherein, the flawless curve representing the posterior is a spline polynome constructed from non-uniform rational B-splines (NURBS).

25. A correction lens according to claim 1, having a total diameter less than the average diameter of the ciliary sulcus.

26. A correction lens according to claim 5, wherein the peripheral part of the support means consists of two separate diametrically opposite, symmetrical parts, each provided with at least one peripherally located indentation of a generally concave shape extending inwards towards the inner part of the support means and the optical axis.

27. A correction lens according to claim 26, wherein the indentation extends to the inner part of the support means.

28. A correction lens according to claim 26, wherein the indentation has a depth of about 0.5 to 1.25 mm.

29. A correction lens according to claim 5, wherein the flawless curve extends along the inner part of the supporting element.

30. A correction element according to claim 5, wherein the peripheral part of support element is provided with a higher flexibility than the inner part.

31. A correction lens according to claim 1, wherein the optical part has a diameter of a size sufficient to avoid edge glare.

32. A correction lens according to claim 31, wherein the optical part has a diameter of at least 5.5 mm.

33. A correction lens according to claim 31 having an optical power larger than ±15 diopters.

34. A correction lens according to claim 9, wherein the maximum lens vault is sufficiently large so as to avoid contacts between the posterior surface and the natural lens in its accommodated state.

35. A method of selecting a suitable implantable correction lens according to any of claims 1 to 34 comprising the steps of:

(i)     determining the power of optical correction;

(ii)    estimating the anterior radius of the natural lens in its non-accommodated state ;

(iii)   selecting a posterior central radius of the correction lens different to that of the natural lens in its non-accommodated state;

(iv)    determining the total lens vault based on the data arriving from steps (ii) and (iii);

(v)     selecting a flawless curve free from points of inflection representing the intersection of the posterior surface and a plane containing the optical axis so as to provide an aspheric posterior lens surface.

36. A method according to claim 35 comprising the step of measuring the anterior chamber depth and considering this value together with the data arriving from steps (ii) and (iii) in the determination of the total lens vault.

37. A method according to claim 35, wherein the anterior chamber depth is measured in both accommodated and non-accommodated states of the eye.

5   38. A method according to claim 35 further comprising the steps of estimating the length of ciliary sulcus and determining the maximum lens diameter.

39. A method according to claim 35, comprising the estimation of the anterior radius of the natural lens in its accommodated state and from this value in combination with the 10   data arriving from steps (ii) and (iii) determining a maximum lens vault having a sufficient safety margin for avoiding contacts between the natural lens and the posterior surface of the correction lens.

15   40. A method of obtaining a suitable intraocular correction lens for implantation comprising the steps of:

(i) determining the power of optical correction;

(ii) estimating the anterior radius of the natural lens in its non-accommodated state;

20   (iii) selecting a posterior central radius of the correction lens different to that of the natural lens in its non-accommodated state;

(iv) determining the total lens height from the data arriving from steps (ii) and (iii);

(v) selecting a lens from a kit of correction lenses, wherein each lens have 25   the features according to any of claims 1 to 34, said kit containing lenses with a range of different optical powers with dimensional features resulting from the estimation of a suitable average population.

41. A method according to claim 40, wherein said selection is based on employing an 30   algorithm capable of transferring the physiological data to a suggested lens and from this result select the most appropriate lens present in the kit.

42. A method according to claim 40 comprising the step of measuring the anterior chamber depth and considering this value together with the data arriving from steps (ii) and (iii) in the determination of the total lens vault.

43. A method according to claim 42, wherein the anterior chamber depth is measured in both accommodated and non-accommodated states of the eye.

44. A method according to claim 40, comprising the estimation of the anterior radius of the natural lens in its accommodated state and from this value in combination with the data arriving from steps (ii) and (iii) determining a maximum lens vault having a sufficient safety margin for avoiding contacts between the natural lens and the posterior surface of the correction lens.

45. A method according to claim 40 further comprising the steps of estimating the length of ciliary sulcus and determining the maximum lens diameter.

46. A method according to claim 45, comprising the step of cutting the lens into a determined maximum diameter before implantation by means of mechanical tools.

47. A method according to claim 45, comprising the step of cutting the lens into a determined maximum diameter by means of an ophthalmic excimer laser.

48. A kit of intraocular lenses with a suitable variety of optical powers, wherein each individual lens is provided with the features according to any of claims 1 to 34.